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Sepsis and multiorgan failure following TVT procedure

Sepsa i niewydolność wielonarządowa po operacji TVT

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Abstract

Tension-free vaginal tape (TVT), is a commonly performed, low risk procedure for treatment of stress urinary incontinence (SUI). Severe complications are rare, but can be potentially life threatening. We present a case of 66 year old patient who sustained bladder perforation at the time of TVT procedure and subsequently developed sepsis rapidly leading to multi-organ failure and triggering sequence of serious complications. During her inpatient stay she required ITU admission, emergency laparotomy, TVT mesh removal, bowel resection due to ischemic colitis and anticoagulation for pulmonary embolism. Despite of clinical picture of sepsis her microbiology tests were almost consistently negative. This case emphasise importance of awareness and quick recognition of TVT related complications. Patient ultimately survived and recovered thanks to timely and coordinated management by the multidisciplinary team of doctors.

Key words: **TVT procedure / multiorgan failure / sepsis /**

Streszczenie

Operacja TVT (tension-free vaginal tape) jest często wykonywanym zabiegiem w przypadku wysiłkowego nietrzymania moczu. Ryzyko związane z tą operacją jest relatywnie niskie a do ciężkich, zagrażających życiu powikłań dochodzi rzadko. Opisany przez nas przypadek dotyczy 66-letniej pacjentki, która doznała perforacji pęcherza moczowego podczas zakładania taśmy TVT. W pierwszych godzinach po operacji jej stan gwałtownie się pogorszył i z objawami sepsy została przyjęta na oddział intensywnej terapii. W trakcie pobytu w szpitalu pacjentka wymagała w różnych odstępach czasu laparotomii, usunięcia siatki TVT, wycięcia fragmentu jelita z powodu niedokrwienia oraz leczenia zatorowości płucnej. Pomimo klinicznych objawów infekcji wszystkie, z wyjątkiem jednego, posiewy bakteryjne były negatywne. Przypadek ten podkreśla wagę szybkiego rozpoznania i skoordynowanego, wielospecjalistycznego leczenia rzadkich komplikacji mogących się zdarzyć po operacji TVT.

Słowa kluczowe: **procedura TVT / niewydolność wielonarządowa / sepsa /**

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Introduction

Tension-free vaginal tape (TVT), described for the first time by Ulmsten in 1995[1], is nowadays the most commonly performed procedure for stress urinary incontinence (SUI). It is relatively low risk operation with high success rates reaching 90% [2]. Complications are usually mild and include urinary tract infection, bleeding, bladder injury, de novo detrusor overactivity (6%) and voiding dysfunction (7%) [3]. Severe adverse events such as bowel injury [4-5], retropubic haematoma formation [6-7] or laceration of major blood vessel [8] are far less common, but can be potentially life threatening. Other, nowadays less commonly used forms of surgical treatment for SUI include laparoscopic or open Burch colposuspension and periurethral injection of bulking agents. These methods are used mostly as a second line treatment and have their own spectrum of complications. Initial reports of periurethral injection of autologous mature stem cells derived from striated muscle and adipose tissue, have very promising results [9-10], but more data from ongoing clinical trials is needed to fully evaluate its efficacy. We present a case of sepsis after TVT insertion leading to multi-organ failure and triggering sequence of serious complications.

Case report

A sixty six year old patient presented to our urogynaecology clinic with a symptomatic cystocele and SUI not responding to physiotherapy. Her medical history included surgery for right hip prosthesis, hypertension controlled by diuretics and ACE inhibitors, hyperlipidaemia treated with statins, ocular hypertension and mild hyperhaemoglobinaemia not requiring treatment. Urodynamic studies confirmed SUI and she opted for TVT procedure combined with anterior colporrhaphy. TVT and anterior vaginal repair with fascial plication and site specific repair was performed under general anaesthetic. Intraoperative cystoscopy revealed perforation at the bladder dome. The procedure was completed without further complications. Additionally, patient received routine intraoperative antibiotic prophylaxis (Gentamycin 240mg) to reduce a risk of infection. She was admitted for an overnight stay with an indwelling urethral catheter on free drainage.

Within a few hours she developed frank haematuria and suprapubic pain. The catheter was found blocked by blood clots and the bladder was distended. This was addressed by insertion of large 3-way catheter and bladder irrigation. Approximately one hour later patient become severely hypotensive (39/24mmHg) and tachycardic (130/min). An arterial blood gas analysis showed marked metabolic acidosis (lactate 15.6 mmol/l, BE -23.1 mmol/l). Haemoglobin count was normal (15.4 g/dl), white cell count was raised to $29.2 \times 10^9/l$ with marked neutrophilia of $25.1 \times 10^9/l$. Within the next few hours her metabolic acidosis was corrected and her condition was stabilised. At this stage we suspected a bowel injury and urgent CT was performed. This revealed blood in the bladder and haematoma in the space of Retzius, but no obvious features of intestinal injury (Figure 1).

The patient underwent midline laparotomy performed as joint procedure with general surgical team. Bowel perforation was excluded. The space of Retzius was opened and the haematoma evacuated but no specific point of bleeding was found. The small extraperitoneal bladder perforation was identified. This was extended to facilitate blood clots evacuation and subsequently

repaired. A normal appendix was removed. In the next 24 hours the patient developed disseminated intravascular coagulopathy (DIC) and multiorgan failure with main blood indices shown in Table I.

She required ITU management, hemofiltration and blood products. Due to a dramatic deterioration of liver function, ischemic hepatitis was suspected. Repeated CT scan excluded pelvic collection. Echocardiogram showed normal ventricular function. On day 12 after initial surgery renal and liver function normalised, hemofiltration was stopped and patient was extubated. Unfortunately, on day 14 her renal function started to deteriorate again and her temperature rose to 38.2 °C. This responded promptly to Meropenem and Vancomycine treatment. Blood cultures at this stage were positive for coagulase negative staphylococcus, but the rest of the septic screen was negative. Repeated CT scan excluded pelvic collections. By day 17 patient's condition improved enough to stop antibiotics and she was discharged from ITU to general surgical ward on day 20.

Her condition deteriorated rapidly on day 21 when she developed a high grade pyrexia (38.6 °C) and tachycardia. Tazocin treatment was started and full septic screen repeated again. This failed to identify focus of infection and decision was made to remove TVT tape as a potential source of microorganisms. The TVT was removed through a suburethral incision under general anaesthetic, but again no organisms were cultured from the tape. The patient was readmitted to ITU where she continued on Tazocin and Teicoplanin treatment, but her condition was not improving. Another CT scan was performed on day 25 which showed features of ischemic colitis (Figure 2).

The patient underwent an extended Hartmanns procedure to resect a necrotic part of her colon. Antibiotics were changed to Meropenem, Fluconazole and Metronidazole which continued until day 30. On day 35 patient developed a low grade pyrexia and nausea. Repeated CT scan showed only small collections in upper abdomen not requiring further surgical intervention. Sigmoidoscopy ruled out further foci of colitis. Patient continued to make slow but steady recovery and by the day 48 her condition improved enough to be discharged from ITU to general surgical ward. On day 61 she developed high temperature, dyspnoea and chest pain. CT scan showed bilateral pulmonary emboli with pulmonary infarction and extensive thrombus within the left renal vein (Figure 3).

This occurred despite ongoing thromboprophylaxis with 5000IU of dalteparin sodium daily. She received appropriate anticoagulation and continued her postoperative recovery. On day 84 patient was discharged to community hospital for postoperative rehabilitation. She remains well and so far without symptoms of stress incontinence.

Discussion

Bladder perforation during passage of TVT trocars occurs on average in 6% of cases [3, 11] and usually does not cause severe morbidity. Treatment varies from few hours of observation in postoperative recovery room to inpatient management with indwelling catheter and continuous bladder drainage [12].

In our unit standard practice is to catheterise bladder and admit patient for overnight observation. Rapid and dramatic deterioration of patient's condition in immediate postoperative period was unexpected as there was no active bleeding from the

Table 1. Main blood indices in the first four postoperative days.

	Day 1	Day 2	Day 3	Day 4
Hb [g/dl]	15	10	9	10
WBC [$\times 10^9/l$]	29.2	4.2	9.1	8.4
Neutrophils [$\times 10^9/l$]	25.01	3.71	8.58	8.24
Platelets [$\times 10^9/l$]	128	52	49	63
Albumin [g/l]	<10	16	17	20
ALT [U/l]	4185	3397	873	341
Urea [mmol/l]	13.9	20.7	8.0	4.5
Creatinine [$\mu\text{mol/l}$]	175	240	110	84

bladder injury site, nor signs of impending sepsis. Initial marked raise of white blood cells and neutrophilia point towards septic aetiology, which in turn lead to metabolic acidosis, ischemia and multiorgan failure. However, microbiology tests were negative throughout her hospital stay, except from aforementioned blood cultures on postoperative day 14, deemed of doubtful significance by consultant microbiologist involved in this patient's care. We theorise that bladder injury and subsequent blockage of catheter played a role in rapid development of sepsis, as it would facilitate leakage of potentially infected urine into extraperitoneal space. Our actions in the first hours from patient's collapse were focused around possible bowel injury as one of main reasons of rapidly developing sepsis after TVT procedure [13]. Retrospectively, we should have considered removing vaginal tape earlier, at the time of laparotomy on postoperative day 1 as this would possibly reduce further morbidity and shorten recovery.

Looking at published literature, serious infective morbidity following TVT is rare, but well described. It presents usually in form of abscess or necrotizing fasciitis [14] rarely leading to overwhelming sepsis. Treatment involves broad spectrum antibiotics, mesh removal and tissue debridement. In majority of cases pathogens are isolated, but there are reports where subsequent microbiology cultures were negative despite of clinical or histological evidence of infection [15]. One case bearing similarities to ours was reported in the USA to manufacturer and user facility device experience database (MAUDE) [16], where patient died from sepsis and multiorgan failure on postoperative day 3 after TVT-O procedure. Subsequent autopsy did not determine any sepsis source and all postmortem cultures were negative. We are not aware if this patient had bladder injury.

We speculate that in our case the problems with a blocked Foley's catheter led to a leakage of potentially infected urine into the retroperic space, which in turn had triggered a widespread sepsis.

This case report emphasizes the importance of awareness, prompt recognition and multidisciplinary involvement in management of rare TVT related complications. Infective morbidity after mesh procedures may have rapid, unpredictable course and be potentially life threatening.

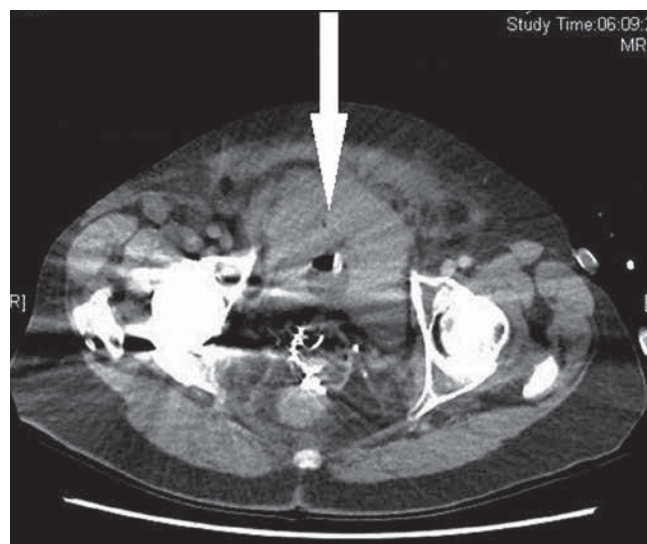


Figure 1. CT pelvis. Arrow indicates retroperic hematoma.

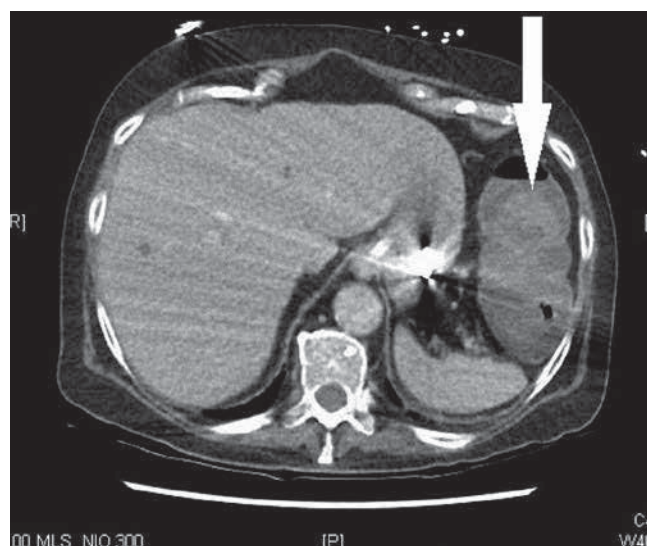


Figure 2. CT abdomen. Arrow shows area of ischemic colitis.

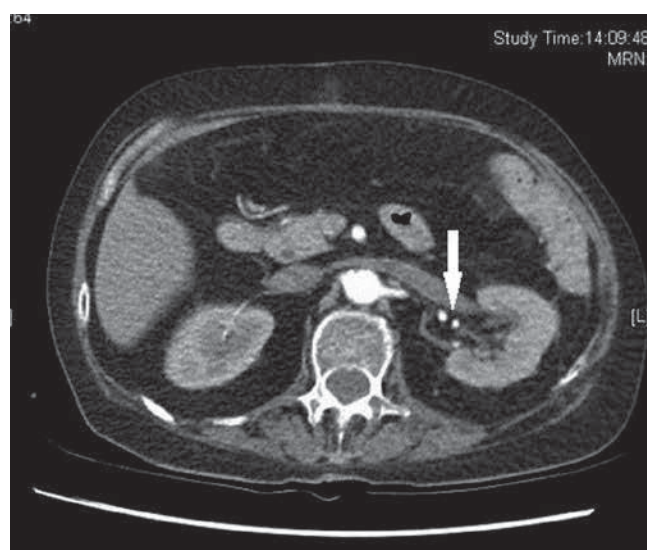


Figure 3. CT abdomen. Arrow shows left renal vein thrombus.

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Authors' Contribution

1. Piotr Stec – concept, assumptions, acquisition of data, article draft, corresponding author.
2. Rowan Connell – concept, revised article critically.

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